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A REVISION OF THE NORTH AMERICAN SPECIES OF
THE TIPULID GENUS *PACHYRHINA* MACQUART,
WITH DESCRIPTIONS OF NEW SPECIES
(DIPTERA)

BY WILLIAM G. DIETZ, M. D.

In his excellent paper on Moravian Tipulidae, Czizek¹ relegates *Pachyrhina* Macquart to the synonymy of *Nephrotoma* Meigen, and, as much as Alexander² accepts this view and applies it, it may be well to state the writer's reasons for retaining the generic name *Pachyrhina*. Schiner³ separated *Nephrotoma* as distinct from *Pachyrhina*. The type and sole European species is *Nephrotoma* (*Tipula*) *dorsalis* Fabricius, and it is differentiated from *Pachyrhina* by the nineteen-jointed antennae of the male (fifteen-jointed in the female). Its Nearctic representative on the Western Continent is *Pachyrhina eucera* Loew. All the other recognized species of *Pachyrhina*, with the exception of *P. polymera* Loew, have thirteen-jointed antennae in the male. Without wishing to invalidate the claim of priority of *Nephrotoma*, I deem it expedient to retain the genus as distinct from *Pachyrhina*. The type of the latter is *P. crocata* Linnaeus, a black species with yellow markings and thirteen-jointed antennae.

From the time of its erection (1834), *Pachyrhina* has been accepted by all writers on the subject, and its relegation to synonymy could only result in confusion without offering any scientific advantage. It is not sharply defined from *Tipula* and its definition, as stated by Alexander⁴ and recognized by other investigators, depends rather on an aggregation of characters than any one in particular. Czizek⁵ in his work and also Brunetti,⁶ have adduced certain venational characters, which if constant, would appear to be decisive.

¹ Tipulidae Moravicae, Zeitschrift des Maerischen Landesmuseums, ii, p. 50, (1911).

² Proceedings of the Academy of Natural Sciences of Philadelphia, 1915, p. 465.

³ Fauna Austriaca, ii, p. 502.

⁴ Op. cit., p. 466.

⁵ Op. cit., p. 50.

⁶ Fauna of British India, p. 340, (1912).

In my investigations of numerous individuals representing a large number of species from within our faunal limits, the hypopygium presents two characters which, independent of others, I consider well-nigh characteristic of the genus. They are, the ninth tergite never longer than wide, generally short, transverse, impressed above mesially, the free margin incised or emarginate in the middle and the lateral angles never acutely extended. The outer apical appendages—upper of Snodgrass—are lanceolate (broadly in *P. oslari*), acuminate, frequently attenuated and incurved beyond the middle. In connection with these hypopygial characters, others will invariably be present to establish the generic status of a given species. These having succinctly been stated by Alexander,⁷ I merely wish to comment on some and add others observed by myself:

1. The short and stout proboscis, together with the rather short and stout first antennal joint, mentioned by Schiner,⁸ are present in all of our species (except *californica*, mentioned hereafter).

2. The radical sector is longer, semi-oblique, with vein, S. c. ending at some distance beyond its origin (*Pachyrhinae tipuloides*), or else, short and oblique in a variable degree, with vein S. c. ending in close proximity to its origin (*Pachyrhinae s. s.*).

3. The presence generally of S. c¹, as a cross vein, in *Pachyrhina*⁹ (absent in *oslari*, *hybrida*, partially atrophied in *pachyrhinoides*, *calinota*); absent in *Tipula* (present in *oropezoides*, *dorsolineata*).

4. Cell M¹, when sessile or very shortly petiolate, is characteristic when present. A petioled cell M¹ occurs frequently and varies considerably in length of its stem, not only in different individuals of the same species, but even in the two wings of the same individual. (Doane¹⁰). According to Schiner,¹¹ specimens of *Tipula nigra* occasionally occur, with cell M¹ sessile.

⁷ Op. cit., p. 466.

⁸ Op. cit., ii, p. 503.

⁹ Prof. Needham in his "Key to the North American genera of craneflies" (Report of the New York State Museum, 1907, p. 244), says under aa-b-Sc.¹ wanting-Tipulinae. In the footnote, same page, specifically includes *Tipula* and *Pachyrhina*.

¹⁰ Entomological News, 1908, p. 179.

¹¹ Op. cit., ii, p. 503 footnote.

5. The basal deflection of Cu and the cross vein M-Cu, at or before the fork of M, first mentioned by Czizek¹² and likewise by Brunetti,¹³ is somewhat variable and, according to Alexander,¹⁴ approached by certain species of *Tipula*. I here wish to note an instance of its variability. In a series of thirteen specimens of *P. (Tipula) pachyrhinoides* Alexander, the basal deflection of Cu and the cross vein M-Cu occurs in three specimens before the fork of M, in nine specimens at, and in one specimen after, the fork of M.

Having thus summarized the characters, more or less constant, as distinctive, I have in the present essay included all species under *Pachyrhina* in which the antennae of the male possess less than nineteen joints in the male, having the proboscis short and stout and in which we find the afore-described hypopygial characters.

The habitus of the species with few exceptions is characteristic and needs no further consideration. The species of *Pachyrhina* relegated by Alexander¹⁵ to *Tipula*, are here retained under *Pachyrhina*, except *californica* Doane. This species with its long proboscis, more elongated first antennal joint, and above all the large ninth tergite with greatly extended lateral angles, makes its relegation to *Tipula*, notwithstanding its strong pachyrhinoid appearance, a necessity. The specific name being preoccupied, I propose *xanthomela* in its stead.

In numerous species, at least some of the wing veins are setulose, the setules arranged in regular rows and approximately equidistant from each other. This character is also observed in many *Tipulas* as well as other Tipulidae. The setules are easily removed by friction, but their presence is always indicated by the setigerous punctures. This setulosity is most frequently present on the costal veins, veins R, R^{1 and 2} and veins M^{1, 2 and 3}. The radial sector and the veins limiting cell 1st M² are almost invariably free, likewise veins Cu and A^{1 and 2}. The veins are entirely glabrous—free from setules—in *P. oslari* (except R) and

¹² Op. cit., ii, p. 50, (1911).

¹³ Op. cit., p. 340, (1912).

¹⁴ Op. cit., p. 466.

¹⁵ Op. cit., p. 466.

others, also in many *Tipulas*, especially the *tricolor* group, *T. rupicola*, *angustipennis*, etc. The setulosity is present on almost all the veins in *P. macrophallus* and *T. orolepoides*. I merely mention this character in order that, with more extensive observations, it may furnish means for the separation of species, or groups.

In concluding these introductory remarks, it is only necessary to state that, separating *Nephrotoma* as distinct from *Pachyrhina*, I have considered the species of the latter under two groups: *Pachyrhinae tipuloides*, which according to Alexander's view would be referable to *Tipula*, and *Pachyrhinae* s. s. or typical species of the genus.

Species with less than nineteen-jointed antennae in the male.

Pachyrhina Macquart

Species with nineteen-jointed antennae in the male.

Nephrotoma Meigen

*Synoptic Table of Species*¹⁶

1. Vein Sc ends at adistance beyond the origin of Rs, the latter longer.
Cell M¹ never sessile.¹⁷ Vein Cu and cross-vein m-cu after the fork of M. **Pachyrhinae tipuloides**. 2
- Vein Sc ends in close proximity to the origin of Rs, the latter short, oblique or subtransverse. Cell M¹ sessile or petioled veins Cu and cross-vein m-cu at or before the fork of M. **Pachyrhinae** s. s. 9
2. Thorax opaque. 3
Thorax shining. 6
3. Fuscous or blackish species. 4
Yellowish species. 5
4. Thorax and abdomen entirely black; legs robust. **oslari** spec. n.
Pleura and sides of abdomen yellowish-gray; legs slender. **hybrida** spec. n.
5. Thoracic stripes margined. **unimaculata** Loew
Not as in the alternative. **macrophallus** spec. n.
6. Thoracic stripes black; stigma brown. 7
Thoracic stripes not black; stigma pale. 8
7. Pleura yellow, spotted. **nobilis** Loew
Pleura grayish-fuscous **collaris** Loew
8. Occiput with a median, fuscous line; thoracic stripes ferruginous, not margined. **pachyrhinoides** Alexander
Occiput without line; thoracic stripes gray, margined. **puncticollis** spec. n.
9. Color black, markings, if any, yellow or reddish-yellow. 10
Not as in the alternative 11

¹⁶ Unless otherwise stated, the types of the species described as new are in the author's collection.

¹⁷ See exception noted in the introduction. Schiner. Fauna Austriaca, ii, p. 503, footnote.

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|--|-------------------------------------|----|
| 10. Abdomen entirely black. | <i>altissima</i> Osten Sacken | |
| Basal portion of abdomen red. | <i>erythrophrys</i> Williston | |
| 11. Thoracic stripes black. | | 12 |
| Not as in the alternative. | | 22 |
| 12. Anterior end of the lateral thoracic stripes curved outward. | | 13 |
| Not as in the alternative. | | 19 |
| 13. The anterior part of the lateral thoracic stripes ends in an opaque or velvety black spot. | | 14 |
| Not as in the alternative. | | 17 |
| 14. Occiput with a shining, triangular spot. | | 15 |
| Occiput opaque, yellow. | <i>virescens</i> Loew | |
| 15. Sides of pronotal scutum, pleura and abdomen, conspicuously spotted with brown. | | 16 |
| Prenotal scutum and abdomen yellow, pleural spots ochre yellow. | <i>perdita</i> spec. n. | |
| 16. Occipital spot broadly triangular. | <i>incurva</i> Loew | |
| Occipital spot narrow, prolonged anteriorly. | <i>excelsior</i> Bergroth | |
| 17. Wings hyaline, a black spot between the antennae. | <i>pedunculata</i> Loew | |
| Wings yellowish-fuscescent or infusate. | | 18 |
| 18. Without spot between the antennae; pleura yellow, spotted black; abdomen striped. | <i>lineata</i> Scopoli | |
| A black spot between the antennae; pleura blackish, spotted yellow; abdominal segments two- to five-banded, black. | <i>lugens</i> Loew | |
| 19. Wings hyaline. | | 20 |
| Wings brownish. | <i>penumbra</i> Alexander | |
| 20. Pleural spots blackish; abdomen without ventral stripe or row of spots. | <i>vittula</i> Loew | |
| Pleural spots at most reddish-brown; otherwise not as in the alternative. | | 21 |
| 21. Occipito-frontal vitta broad; a small distinct spot above each eye; stigma well-defined, brown; abdomen with interrupted ventral stripe. | <i>snowii</i> Doane | |
| Occipito-frontal vitta narrow; no supra-orbital spots; stigma ill-defined, pale yellowish-fuscescent; abdomen with a row of black spots. | <i>snowii alternata</i> subspec. n. | |
| 22. Thorax opaque or subopaque. | | 23 |
| Not as in the alternative. | | 31 |
| 23. Lateral margin of abdominal tergum and posterior margin of segments banded black. | <i>macrocera virgata</i> subsp. n. | |
| Not as in the alternative. | | 24 |
| 24. Antennae of male longer than usual, flagellar joints when bicolored, fuscous at base. | | 25 |
| Antennae of male not longer than usual; flagellar joints fuscous, yellow at base; more rarely unicolorous. | | 27 |
| 25. Eighth sternite of male with two digitiform processes. | | 26 |
| Eighth sternite with a median cone-like process. | <i>macrocera gnata</i> subspec. n. | |

¹⁹ Bulletin American Museum of Natural History, xxxii, p. 42.

58. Antennae thirteen-jointed. 59
 Antennae with more than thirteen joints in both sexes. . . **polymera** Loew
59. Lateral stripe and posterior margin of abdominal segments, black.
approximata spec. n.
 Abdomen with lateral and ventral rows of black spots. 60
60. Segments of antennal flagellum excised beneath; abdomen with dorsal row of spots; eighth sternite with deep, u-shaped emargination.
brevicornis Doane
 Segments of flagellum cylindroidal; abdomen with dorsal vitta; eighth sternite protuberant, scarcely emarginate. . . . **stigmatica** spec. n.

Pachyrhina osleri spec. n. (Pl. IV, fig. 1., pl. V, fig. 21.)

Tipuloid; entirely black with a grayish-white pruinosity. Flagellar joints of the antennae prolonged beneath at the apex, giving the antennae a serrate appearance. Stigma pale brown.

Male. Length, 11.5 mm.; wing, 12.5 mm.

Head. Face, space about base of antennae, antero-inferior periorbital margin and sides of occiput, densely white pruinose, median space of occiput dull black. Proboscis very short and thick, frontal prolongation beset with black hairs. Antennae robust, short, entirely black, without whorls of setaceous hairs, with a very short, white pubescence on the apical margin of the segments, the apices of segments three to seven extended beneath, less marked in the following segments, joints eleven and twelve longer than the preceding ones, the last joint very slender.

Thorax. Pronotal scutellum sordid yellow; scutum hairy, darker in middle portion. Mesonotal praescutum without hairy vestiture, grayish-pruinose, stripes blackish, broad, the median stripe divided by a dark line, the lateral stripes indistinctly prolonged upon the mesonotal scutum. Scutellum and postnotum grayish-white pruinose with dark median line. Pleura, with the exception of the upper part of the mesopleural sclerite, densely grayish-white pruinose; pleuro-dorsal membrane dark yellowish-brown.

Legs rather robust, of moderate length, brown; coxae densely grayish-white pruinose, femora yellowish-brown, darker towards the apices, pubescence very short, black, appressed; tarsi black. Halteres dark brown, yellowish at base. Wings grayish, broad; Cells C and Sc yellowish, stigma pale yellowish-brown; vein R setulose, vein Sc¹ atrophied; venation as in figure.

Abdomen grayish-pruinose except along the dorsum, where its absence leaves a broad black stripe of the ground color; the extreme posterior margin of segments three to eight, whitish, the lateral margins more broadly, yellowish-white. Eighth sternite with a slight emargination in the middle and one on each side. Hypopygium blackish, appendages ferruginous; ninth tergite very short, impressed anteriorly, posterior margin emarginate in the middle, lateral angles acute, upper appendages broadly lanceolate, inflexed; ninth sternite with closed suture; pleural suture absent. Pl. V, fig. 21.

Female. Length, 13 mm.; wing, 12 mm.

Very similar to the male. Antennae shorter and less markedly denticulate. Sides of scutellum and postnotum yellowish. The lateral margin of the abdominal tergites scarcely at all paler. Ovipositor ferruginous, dorsal valves

long, infusate at base and apex, the latter pointed; lower valves very short, scarcely two-fifths the length of the upper valves, broad, acuminate.

Holotype: ♂; South Park, Colorado. June 20, 1916. (E. J. Oslar.)

Allotype: ♀; topotypic, June 16, 1916.

Paratypes: one male and one female, topotypic; one female; Cochetopa, Colorado, July 3, 1913, (A. K. Fisher).

In appearance this species appears closely allied to *Tipula cervicula* Doane, but the formation of the ovipositor, aside from other characters, easily distinguishes it. Dedicated to Mr. E. J. Oslar.

A badly mutilated specimen, which I collected in this locality—Hazleton, Pennsylvania—is closely allied. The head is deep ferruginous, opaque, antennae missing; thoracic dorsum orange-yellow, stripes as in *oslari*; scutellum, postnotum and base of abdomen, dark orange-yellow. The specimen was immature, the abdomen contracted; it is probably a female.

One paratype in the collection of the United States Biological Survey.

Pachyrhina hybrida spec. n. (Pl. V, fig. 22.)

Closely allied to and congeneric with *P. oslari*. Antennae entirely black; somewhat flattened, not serrate. Underside of head, pleura and sides of abdomen, dark yellowish.

Male. Length, 8.5 mm.; wing, 11 mm.

Head. Dark brown above, underside and proboscis yellowish, periorbital margin yellowish-white; face whitish on the sides, fuscous in the middle; frontal prolongation very short, brown; palpi and mouth parts brown, the former short. Antennae stout, not elongated, entirely black, flagellar joints scarcely longer than wide, somewhat flattened, the last joint long, slender, styloid; the antennae, with the exception of the four basal joints, clothed with a dense pubescence, but without hairs or whorls of bristles.

Thorax. Ground color blackish. The dorsum densely sordid yellowish-pruinose. Pronotal scutellum whitish on the sides; the mesonotal stripes broad, darker, the median stripe wider anteriorly and divided by a dark line; the lateral stripes extending obliquely upon the scutum. Scutellum velvety black anteriorly, brownish-yellow each side posteriorly. Postnotum with median black line. Pleura dark yellowish-gray. Halteres yellowish, infusate towards the apex, club fuscous, apex grayish-white. Wings grayish, somewhat infusate, especially in costal portion of the wing; cell M^1 with short petiole, otherwise, venation as in *P. oslari*, vein Sc^1 present. Legs slender, brown; coxae yellowish-gray, femora towards the base yellowish, and like the tibiae, blackish towards the apex, outer tarsal joints black.

Abdomen shining; dark brown above, tergites three to eight narrowly edged with white posteriorly; sternites one to five or six, dark brown in the middle, remaining sternites yellowish-brown; the lateral parts of tergites and sternites sordid yellow, the seventh sternite emarginate in the middle, the eighth very slightly emarginate. Hypopygium dull yellowish; the ninth tergite very short; outer appendages lanceolate; ninth sternite entire without median suture or incision; the pleural suture appears to be straight. Pl. V, fig. 22.

Holotype: ♂; Denver, Colorado. April 14, 1916. (E. J. Oslar.)

Closely allied to, yet very distinct from, *P. oslari*.

Pachyrhina macrophallus spec. n. (Pl. IV, fig. 2; pl. VI, fig. 24.)

Tipuloid. Yellow. Antennae of male elongated. Wings hyaline, stigma fuscous. Penis of unusual length.

Male. Length, 14 mm.—minus penis—; wing, 13.5 mm.

Head yellow. Mouth parts, sides of proboscis and palpi light brown, last joint of the latter scarcely as long as the three preceding joints together; frontal elongation and nasus shining, beset with black hairs which form a pencil at the end of the nasus; remainder of head opaque, face pale yellow, occiput with short, fuscous line. Antennae long and slender, scapal joints yellow, first flagellar joint yellowish-brown, rest of flagellum brown, besides the incomplete verticles of long setaceous hairs at the base of segments, there are many irregularly placed hairs, especially towards the base; pubescence dense, pale; segments cylindroidal, slender.

Thorax. Dorsum feebly shining, pale yellow; pronotal scutum brownish-yellow in middle portion. Praescutal stripes reddish, the median stripe broad and but little narrowed posteriorly, the lateral stripes narrower, not curved anteriorly, leaving the lateral margin free and giving the thorax a margined appearance, stripes very narrowly and indistinctly margined with brown. The lateral stripes are continued upon the scutum, leaving the lateral margin and the middle portion of the latter pale yellow. Scutellum and postnotum darker reddish-yellow, lateral margin and median stripe of the latter, pale yellow. Transverse suture tinged with pale brown in the middle. Pleura reddish-yellow, whitish pruinose, a stripe along the sterno-pleural suture and a few smaller spots pale yellow; the anterior and posterior ends of the pleuro-dorsal suture, black. Halteres yellowish-brown, knob dark brown, apical edge paler. Legs slender, yellowish, pubescence dense, coarse, blackish; femora slightly, tibiae more markedly infusate at the tip; tarsi blackish, the metatarsi approximately as long as the tibiae. Wings entirely hyaline, stigma brown, preceded by a white, hyaline spot, apical part of wings pubescent, cord at base of cells R^2 and 3 and R^4 and 5 , infusate, all the veins, except vein Cu, more or less setulate. Venation as in figure.

Abdomen yellow, a fuscous dorsal stripe, indistinct anteriorly, irregular, more diffusive and darker posteriorly, an irregular row of black spots along the margin of the tergites; venter, suffused with pale fuscous. The seventh

sternite narrowly, the eighth broadly, V-shaped emarginate. Hypopygium ferruginous, shining; ninth tergite but little wider than long, strongly narrowed posteriorly, with a deep, oval impression in the middle before the posterior margin, the latter with semicircular incision; from below the margin of the latter project two slender, filamentous processes; outer appendages pale yellow, apical two-fifths very slender, curved downward. Penis of unusual length, penis guard semitubular; the gynophores (?) consist of two strongly chitinized plates.

Female. Length, 18 mm.; wing, 13.5 mm.

Antennae relatively short, the flagellar points yellowish-fuscous, dark fuscous at base. The abdominal stripes still more diffused and ill-defined; eighth tergite almost entirely yellow. Ovipositor testaceous, darker in basal portion; valves of nearly equal length, the dorsal pair obtusely, the ventral pair acutely pointed.

Holotype: ♂; Deer Creek, Provo Canyon, Utah. August, 1913. (Tom Spalding.)

Allotype: ♀; topotypic, August 20, 1913.

Paratypes: five males, ten females, topotypic; one female, Milpitas, California, April, 1912, (H. Miller).

In the tipuloid group this form stands rather isolated. In coloration it resembles *P. (Tipula) pachyrhinoides* Alexander, but is much larger, the thorax less shining and the abdomen striped. In the unusual length of the penis, it differs from any other species of *Pachyrhina* or *Tipula* known to me. The occipital line varies in length and degree of coloring; in same specimens, there is a small fuscous dot each side of the vertex. The California specimen has the thorax subopaque, the dorsal abdominal stripe black, entire; the eight segment and the hypopygium very dark brown.

***Pachyrhina puncticollis* spec. n.** (Pl. IV, fig. 3.)

Tipuloid. Sordid yellow. Antennae—male—rather short, flagellum black; a blackish spot each side of base of occiput. Thoracic stripes grayish-pollinose, strongly margined with brown.

Male. Length, 12 mm.; wing, 12 mm.

Head ocher-yellow, shining; mouth parts and palpi brown, the last joint of the latter short. Proboscis short, thick; nasus beset with short, black hairs. Antennae short, stout, bent back they do not reach the alar insertion; basal joint yellow, second joint yellowish-fuscous, flagellum entirely blackish, somewhat compressed, segments of nearly equal thickness, not emarginate beneath or thickened at base, the last three joints attenuated, and longer, a verticel of setae at base of segments; pubescence very fine and short. Frontal gibbosity marked, a fuscous spot on the vertex, close to the orbital margin,

two larger, fuscous, approximate spots at the base of the occiput, two very minute dots at the base of the neck and a larger, black spot each side of the neck.

Thorax sordid yellow. Pronotal scutum fuscous on the sides, scutellum pale fuscous, whitish anteriorly; praescutal stripes grayish-pruinose, wide, heavily margined with brown, the middle stripe divided by an indistinct yellowish line. Scutum with two large, coalescent, grayish-pollinose spots, margined with brown. Scutellum testaceous, shining. Postnotum pale yellow, shining, sides yellowish-fuscous, posterior declivity blackish. Pleura pale yellow with a whitish sheen; inferior half of sternopleura, lower half of mesopleura and some spots, grayish-fuscous. Coxae yellow, the anterior and middle pair anteriorly, the posterior pair on the sides, streaked with dark brown. Legs moderately slender, femora and tibiae yellowish-brown, darker at the apices; tarsi fuscous, metatarsi shorter than the tibiae, the whole leg beset with a very short, appressed, black pubescence. Halteres brownish, base paler, knob fuscous, white at tip. Wings grayish, cells C and Sc fuscous, stigma pale fuscous, vein Cu margined with fuscous, a faint, hyaline spot before the stigma, a similar spot at distal end of cell R, extending through cell 1st M², into M³, the veins included in this spot are pale. Costal veins and vein R setulose. Venation as in figure.

Abdomen sordid yellow, shining, without stripes or rows of spots. Eighth sternite slightly emarginate. Hypopygium concolorous; ninth tergite brownish at the base, narrowed posteriorly, deeply impressed about the middle and the posterior margin with a semicircular emargination; the outer appendages lanceolate, acuminate; median suture of ninth sternite open; pleural suture curved upward anteriorly.

Holotype: ♂; Clear Creek, Colorado. September 12, 1916. (E. J. Oslar.)

Paratype: ♂; Leadville, Colorado. September 1, 1914. (A. K. Fisher.)

An isolated form, not closely related to any other species known to me. The Radial sector is shorter and more arcuated than usual in this group. The Leadville specimen, has cells C and Sc yellowish; and the ninth tergite is not brown at the base.

Paratype in the collection of the United States Biological Survey.

***Pachyrhina perdita* spec. n.**

Yellow. Occiput with shining triangle. Thoracic stripes black, the lateral stripes curved outward and ending in an opaque, black spot. Wings hyaline, stigma black. Cu and crossvein M-cu before the fork of M.

Female?. Length—to end of seventh abdominal segment—15 mm.; wing, 14.5 mm.

Head entirely yellow, proboscis short, frontal prolongation shining, remainder opaque, mouth parts and palpi concolorous, last joint of the latter longer than the three preceding joints together. Antennae of moderate length, basal joint yellow, joints two and three dark yellow, remainder yellowish-brown, finely pubescent, segments cylindroidal, outer joints very attenuated, all with a verticil of setaceous hairs at the base, much longer on the outer joints. A fuscous patch above each eye; a large, fuscous, pentagonal, shining occipital spot; underside of head and portion behind the eyes, pale yellow.

Thorax yellowish-white, opaque. Praescutal stripes black, narrowly edged with ferruginous, shining, the median stripe widened at its anterior end, gradually narrowed posteriorly; the lateral stripes narrower, the anterior end curved outward and ending in a large opaque spot. Scutum with oblique, reddish stripes, infuscate anteriorly. Scutellum testaceous with blackish median groove. Postnotum bone white on the sides, testaceous posteriorly and a large brown patch anteriorly. Outer part of transverse and posterior end of pleuro-dorsal suture black. Pleura bone white, lower part of sterno- and pteropleura and greater part of mesopleura, ocher-yellow. Halteres dull yellowish-white, knob fuscous, paler at tip. Wings hyaline with a faint, grayish tint, stigma brown, basal section of vein R^4 and ^{5} and cross vein R-M infuscated, apex infuscated, cell M^1 with very short petiole. Rs short, slightly curved, oblique; Cu and crossvein M-Cu before fork of M; Sc ends opposite of origin of Rs; Sc^1 present.

Abdomen ocher-yellow, extreme base of first tergite blackish, second tergite with two large, irregular, brown patches, tergites three to seven tinged with yellowish-fuscous, the seventh black posteriorly—remainder of abdomen wanting—lateral edges of tergites tinged with fuscous.

Holotype: ♀; Aweme, Manitoba, Canada. August 7, 1913. (E. Criddle.)

From *P. virescens*, *incurva* and *excelsior*, the other three species in which the thoracic stripes are black, the lateral stripes curved outward and ending in an opaque, black spot, the present species differs from *virescens* in the shining, occipital spot, and from *incurva* and *excelsior* in the proboscis, mouthparts and palpi being entirely yellow.

***Pachyrhina snowii alternata* subsp. n.**

Differs from true *P. snowii* Doane by its narrow fuscous occipital stripe, absence of spots on the vertex and the pale, ill-defined, yellowish-fuscous stigma. The interrupted abdominal stripes, with the exception of the dorsal stripe of *snowii*, are represented by rows of spots or dashes.

Holotype: ♂; Northwestern Colorado. July 20, 1911. (E. J. Oslar.)

Paratype: ♂; Platte Canyon, Colorado. August 19, 1915. (E. J. Oslar.)

***Pachyrhina macrocera gnata* subsp. n.**

The essential difference between this subspecies and true *P. macrocera* Loew, consists in the cone-like prolongation of the eighth sternite of the male of the former, while in true *macrocera*, the eight sternite is emarginate, while the lateral angles of the emargination are prolonged in the form of digitiform processes; of minor importance is the dark, yellowish-fuscous antennal flagellum, the segments dark brown at base and the eighth and ninth tergites of the male nearly entirely fuscous.

Holotype: ♂; Beaver Falls, Wisconsin. August 4, 1909.

***Pachyrhina macrocera atrocera* var. nov.**

Agrees in habitus and structural details with true *macrocera*, but is somewhat more somber in appearance. The antennal flagellum is entirely dark brownish black. The seventh abdominal segment apically, the eighth segment and the ninth tergite entirely brown. Structurally, the eighth sternite and hypopygium do not appear to differ from the typical form.

Holotype: ♂; St. Johns, Pennsylvania. July 5, 1917. (W. G. Dietz.)

***Pachyrhina hirsutula* spec. n. (Pl. IV, fig. 4.)**

Appearance and habitus of *P. macrocera* Loew. Wings sparsely hairy.

Male. Length, 11.5 mm.; wing, 12.5 mm.

Head yellow; proboscis shining, sides, mouthparts and palpi brown, joints three and four of the latter yellowish-brown, the last joint of moderate length. Antennae long, joints one to three yellow, the third joint nearly twice the length of the two preceding joints together. Joints four and five yellowish-fuscous, remainder dark fuscous; pubescence dense, whitish; verticels of blackish setae at base of segments; occiput opaque, a minute fuscous dot above each eye.

Thorax opaque, dorsal stripes obscure; pleura pale yellow, no markings. Scutellum and postnotum with same luster. Halteres pale yellow, club infusate, pale at apex. Legs slender, yellow, femora and tibiae slightly darker at the apex, outer tarsal joints infusate, the metatarsi shorter than the tibiae; pubescence very short, blackish, appressed. Wings hyaline, with faint grayish tint, costal cells yellowish, stigma pale fuscous, costo-apical portion infusate; surface beset with moderately long, very fine, scattered hairs; costal veins, vein R and all veins beyond the cord, except those which limit cell 1st M², markedly setulose. Venation as in figure.

Abdomen yellowish-testaceous, shining, brown towards the caudal end, lateral and ventral rows of black spots. Eighth sternite blackish at base, deeply emarginate with a digitiform process from the base of the emargination, the lateral angles of the emargination prolonged into an acute angle. Hypopygium dark testaceous, appendages pale yellow, the outer appendages elongate lanceolate, curved ventrad; inner appendages cone-like and ending in a drawn out point; ninth tergite a trifle wider than long, broadly but not deeply impressed anteriorly, sulcate posteriorly, margin narrowly emarginate in the middle.

Holotype: ♂; Hazleton, Pennsylvania. May 23, 1916.

Paratype: ♂; topotypic.

Very closely resembles *P. macrocera* Loew, from which it differs in the hairy wings; the abdomen strongly infusate posteriorly and the differently constructed eighth sternite.

Pachyrhina urocera spec. n. (Pl. IV, fig. 5; pl. VI, fig. 25.)

Yellowish. Antennae of male not elongate, flagellar joints fuscous, yellow at base. Thoracic dorsum subopaque. Inner apical appendage of hypopygium large, conspicuous, turned outward.

Male. Length, 13.5 mm.; wing, 13.5 mm.

Head sordid yellowish, shining. Mouthparts and palpi yellowish-fuscous, the last joint of the latter shorter than the preceding joints together. Proboscis short, sides infusate, nasus beset with pale hairs. Antennae not elongate, three basal joints pale yellow, the third joint approximately as long as the two scapal joints, flagellar joints infusate, yellowish at the base, with a verticil of hairs; pubescence fine, short, whitish. Occiput darker on the sides behind the eyes.

Thorax yellowish-white. Pronotal scutum with a dark line each side. Praescutum subopaque with feeble luster, stripes and space anterior to the parasutural foveae ferruginous, the median stripe somewhat narrowed posteriorly and divided by an indistinct paler line. Scutum with a slight sheen and broad, oblique, ferruginous stripe each side. Scutellum and postnotum brownish-yellow, shining. Pleura and coxae, pale yellow, shining, with whitish sheen. Halteres yellowish towards the base, infusate apically, knob fuscous, apical edge whitish. Legs long and slender, sordid yellow with dense, fine, appressed, blackish pubescence, tarsi fuscous outwardly, the metatarsi longer than the tibiae. Wings with marked yellow tint, costal cells yellowish-fuscous, stigma fuscous, costo-apical part somewhat infusate. Veins R and M¹, ² and ³, very sparsely setulate.

Abdomen dark yellow; tergites one to seven with a pale fuscous, median spot before the middle of the segment; segments three to eight with a black spot each side and a ventral row of similar spots; eighth sternite with V-shaped emargination, the sides and especially the angles, fringed with long, yellow hairs. Hypopygium reddish-yellow, appendages paler; ninth tergite short, a rounded fovea each side of the median line, lateral angles rounded, the posterior margin with semicircular emargination in the middle and fringed with pale yellow hairs; outer appendages lanceolate, claw-like, the apices blackish, attenuated; inner appendages large and conspicuous, twisted, curved down, out, upward and somewhat outward, ending in a blackish spine.

Holotype: ♂; Black Mountains, North Carolina. June 21, 1912. (Wm. Beutenmueller.)

Paratype: ♂; topotypic.

Closely resembles *P. tenuis* Loew and *P. brevicornis* Doane, from both of which it differs in the large, conspicuous, inner

hypopygial appendages, and both of which it resembles in the fuscous, flagellar joints, yellow at the base. The mesonotum is less opaque than in *P. tenuis* but lacks the luster of *P. brevicornis*. The paratype specimen has the thoracic dorsum less opaque and the stripes ill-defined, with the interspaces obliterated. The costal cells are paler. Together with *P. okefenoke* Alexander and *cornifera* sp. n., these three species, because of the greatly developed inner appendages of the hypopygium, form a peculiar group in our Southern States. For differentiation see under *cornifera* and also Table of Species.

Pachyrhina cornifera spec. n. (Pl. IV, fig. 6; pl. VI, fig. 25.)

Bone yellow. Flagellar joints, except the two basal joints, brown. Thoracic dorsum opaque. Wings with faint, yellow tinge, stigma dark brown. Abdomen with lateral and ventral rows of black spots. Inner apical appendages of male hypopygium, slender, serpentine, directed laterad.

Male. Length, 14 mm.; wings, 15 mm.

Head pale yellow. Mouth parts and palpi brown. Frontal prolongation shining, beset with pale, yellowish hair; sides of rostrum light brown. Antennae not elongated, basal three joints yellow, fourth joint yellowish-brown, outer joints brown, pubescence pale and rather long, joints cylindroidal, basal whorls of three to five setaceous hairs, the latter long. Occiput shining; an obscure, brownish spot each side of base of neck.

Thorax opaque above, yellow. Pronotal scutum brownish in the middle. Mesonotal stripes yellowish-red, the middle stripe wider and somewhat shining anteriorly, divided by a yellowish median line; all the stripes slightly darker along their margins. Transverse suture not tinged with black. Scutum, scutellum and postnotum ochreous, with some luster. Pleura ochreous with a feeble, whitish pruinosity. Halteres sordid yellow, club pale brown. Legs yellowish, slender, metatarsi longer than the tibiae; outer tarsal joints infusate. Wings with yellow tint, costal cells and costo-apical part of wing beyond the stigma, deeper yellow; stigma dark brown; veins almost entirely glabrous.

Abdomen sordid yellow, somewhat shining, some obscure dorsal spots, lateral and ventral rows of black spots. Eighth sternite with deep, V-shaped incision, the edges of which are fringed with long, golden-yellow hair. Hypopygium concolorous; the ninth tergite wider than long, tumid each side, the two sides divided by a deep furrow which widens anteriorly and ends posteriorly at the base of the deep, triangular emargination of the posterior margin, each side acutely-triangular at the apex; outer appendages lanceolate, attenuate and incurved apically, the inner appendages are slender, twisted, rod-like, compressed in basal half and directed outward; the rod-like appendages of the penis-guard are strongly marked, claw-like.

Holotype: ♂; Four Mile Run, Virginia. July 24, 1915. (C. P. Alexander.)

Paratypes: three males. Pollochsville, North Carolina. July 8, 1915. (C. P. Alexander.)

In appearance, this species is scarcely distinguishable from *P. urocera* and *P. okefenoke*, except that the outer flagellar joints are entirely brown. However, the form of the peculiar, slender, serpentine, inner apical appendages of the hypopygium easily distinguishes this species from the other two, in which likewise these appendages are strongly developed. The type and one paratype are in the collection of Mr. C. P. Alexander, who kindly placed his material in my hands, two paratypes in author's collection. Cell M^1 varies from sessile to moderately long stemmed.

Pachyrhina tenuis hamata subsp. n. (Pl. VII, fig. 28.)

Agrees in all essentials with *P. tenuis* Loew. The occiput is subopaque; thoracic dorsum with considerable luster, but differs in the large, geniculate, rod-like appendages of the guard of the penis. There is a rather large, reddish spot in front of the alar insertion, which I have not observed in any specimen of *P. tenuis* at my disposal.

Holotype: ♂; Sullivan County, New York. August, 1912.

Pachyrhina calinota spec. n. (Pl. IV, fig. 7.)

Yellow. Frontal prolongation with brown median stripe. Occiput opaque with fuscous line. Thoracic stripes silvery-gray, pruinose, the lateral stripes curved outward and ending in a velvety black spot. Stigma brown.

Male. Length, 13 mm.; wing, 11 mm.

Head. Mouth parts and palpi dark yellow, tinged with fuscous, the last joint of the latter a little longer than the three preceding joints together. Proboscis very short; pale yellow, frontal prolongation with median dark brown stripe extending to end of nasus, the latter densely beset with black hairs. Face and periorbital margin pale yellow. Antennae moderately robust, not elongated, joints one to three sordid yellow, the following joints brownish-yellow, basal enlargement black with a verticel of black setae; pubescence very short, dense, whitish. Front and occiput orange-yellow, opaque, gibbosity marked, a small brown dot behind the antennal insertion; occiput with fuscous line which does not extend to the summit of the gibbosity.

Thorax. Pronotal scutum with median brown spot, sides tinged with fuscous and edged posteriorly with dark brown. Praescutum orange-yellow, opaque, sides paler, stripes silvery-gray pruinose, shining, edged with ferruginous, the median stripe strongly narrowed posteriorly and divided by a black median line; the lateral stripes curved slightly outward anteriorly, with an opaque, blackish spot beneath its anterior end. Scutum sordid yellowish, an oblique stripe each side, similar to those of the praescutum and consisting of two coalescent spots, the antero-exterior of which is the smaller; an elongate

dark brown spot in the middle of the median pale stripe; outer part of transverse suture and its continuation in the pleuro-dorsal suture before the alar insertion, deep velvety black. Scutellum yellowish-brown, shining. Postnotum deep yellow, opaque, brownish along median line and posteriorly. Pleura pale yellow with a whitish sheen, lower half of mesopleura ochraceous, a spot in upper portion and several other spots more or less distinct, dark fuscous. Halteres sordid-white, paler at base, knob infusate, apex white. Wings broad, lightly tinted with gray, basal part yellowish, costal cells brownish-yellow, stigma brown, apex infusate, cord at base of cells R^2 and 3 and 4 and 5 slightly infusate. Vein C, Sc, R and its branches, and M^{1+2} and 3 more or less distinctly setulose. Venation as in figure. Legs yellowish, pubescence dense, short and black, femora and tibiae blackish towards the apices, tarsi fuscous, metatarsi about as long as the tibiae.

Abdomen deep yellow, shining, tergites two to six each with a large, brown spot, segment seven nearly, the eighth segment entirely, blackish, lateral margins of tergites indistinctly blackish; venter pale; eighth sternite scarcely emarginate. Hypopygium brown; ninth tergite blackish, very small, bifovate posteriorly, emarginate in the middle; appendages pale yellow, the outer appendages elongate-lanceolate, incurved, the inner appendages claw-like, curved upwards, their apices projecting under the curved ends of the outer appendages; a carina-like process projects from the suture of the ninth sternite.

Female. Length, 18 mm; wing, 12 mm.

Very similar to the male. Antennae scarcely shorter, lighter yellow. Ovipositor ferruginous; upper valves narrow, obtusely rounded at apex, lower valves two-thirds the length of the upper, broader, rounded at apex.

Holotype: ♂; Floodwood, Schoolcraft County, Michigan. July, 1915. (J. S. Rodgers.)

Allotype; ♀; topotypic.

Paratypes: five males and 7 females, topotypic; two females, Plummer's Island, Maryland, June 8, 1913, (A. Wetmore) and July 14, 1907, (A. K. Fisher).

A very distinct species. From those species having the thoracic stripes not black and the lateral stripes bent outward and ending in a black, opaque spot, it differs, among other characters, from *P. punctum* Loew in its occipital line, and from *P. wulpiana* Bergroth in the absence of a shining triangular spot; from *P. opacivittata*, *montana*, *evasa* and *nexilis* in the bicolored flagellar joints. Specimens in which the pruinosity of the thoracic stripes has been abraded, there have a ferruginous color. Two paratypes are in the United States Biological Survey collection, and a male and a female specimen in Mr. Alexander's collection.

***Pachyrhina opacivittata* spec. n. (Pl. IV, fig. 9.)**

Similar to *P. calinota*. Antennal flagellum, except the first joint, blackish. Mesonotal scutum with median, velvety-black stripe.

Male. Length, 12.5 mm.; wing, 12 mm.

Head as in *P. calinota*. Antennae robust, not elongate, scapal joints yellow, third joint yellowish-brown, following joints blackish, strongly emarginate beneath and enlarged at base, with verticel of rather long, black setae, outer joints more elongate, pubescence short, dense and white. Vertex without dots; occipital stripe a little wider and shining.

Thorax as in *P. calinota* with these differences: Pronotal scutum without median brown spot; dorsal stripes ferruginous, without pruinosity; scutum with median, black, velvety stripe. The dark fuscous spot in upper part of mesopleura not distinct. Halteres and legs as in *P. calinota*. Wings broad, with fuscous tinge; cell Sc and margin of Cu and Cu¹ brownish; stigma fuscous. Cell 1st M¹ open, veins M and M³ in part, atrophied. Veins C, Sc, R and veins M^{1, 2} and ³ finely setulose. Venation as in figure.

Abdomen deep yellow with faint luster, basal half of first tergite brown, a pale brown median line posteriorly tergites, two to four with increasingly larger, fuscous patches, similar patches on tergites five and six, pale brown, seventh tergite tinged with fuscous tergites, eight and nine, yellowish brown, a broad, dark brown lateral stripe, less marked on segments seven and eight. Hypopygium similar to that of *P. calinota*, but the inner appendages do not protrude beyond the upper appendages.

Holotype: ♂; Aweme, Manitoba, Canada. (E. Criddle.)

Although very closely resembling *P. calinota*, this species is distinguished at once by its very stout antennae, blackish flagellum, the segments of which are deeply emarginate beneath, the velvety-black vitta of the mesonotal scutum, the subopaque abdomen with broad, lateral stripes. Cell 1st M² wide open, is certainly anomalous, but, although recorded also in *Tipula imperfecta* Alexander²¹ and *Tipula alta*, Doane,²² no specific value should be attached to it.

***Pachyrhina montana* spec. n. (Pl. IV, fig. 8.)**

Allied to *P. calinota*. Frontal prolongation with ferruginous stripe. Antennae, except the first joint, dark brown. Occiput with triangular shining spot. Pleura conspicuously spotted and abdominal tergites banded with dark brown.

Female. Length, 15.5 mm.; wing, 13 mm.

Head yellow. Frontal prolongation shining, with ferruginous median stripe extending to end of nasus, the latter beset with blackish hairs; mouth parts and palpi concolorous, the latter slightly brownish, the last joint shorter than

²¹ Proceedings Acad. Nat. Sciences, Philadelphia, 1915, p. 484, pl. xvi, fig. 9.

²² Annals of the Entom. Society of America, v, p. 44, (1912).

the preceding joints. Face, under side of head and postocular spaces pale-yellowish. Basal joint of antennae yellow, remainder dark brown, joints cylindroidal, setae of basal whorls long, blackish. Occiput orange-yellow, with large, broadly triangular, shining spot.

Thorax pale yellow. Lateral portion of praenotal scutum brown. Praescutum and scutum as in *P. calinota*, but the black, velvety spot at the anterior end of the lateral stripe is larger, the stripes ferruginous, not pollinose, and the scutum is without the median black spot. Scutellum lustrous, ferruginous, with median black stripe. Postnotum opaque, pale yellow on the sides, ocherous posteriorly, with a large, square, shining black spot anteriorly. Pleura concolorous; inferior portion of mesopleura dark brown anteriorly, ferruginous behind; mesopleural suture black; metapleura conspicuously in front, less so behind, and lower angle of ptero-pleura, dark brown. Halteres pale yellowish, knob fuscous. Legs slender, brownish-yellow, outer half of femora blackish, tibiae infusate towards the apex, shorter than the metatarsi, outer tarsal joints fuscous; pubescence very short, blackish. Wings hyaline, costal cell concolorous, cell Sc pale yellow, basal portion of vein R^4 and 5 , cross-vein R-M and apex of wing infusate; veins C, Sc and R almost imperceptibly setulose. Venation Pl. IV, fig. 8.

Abdominal tergum lemon-yellow, base white, a broad dorsal stripe, less distinct posteriorly and expanding into a transverse fascia on the posterior part of the tergites, dark fuscous; lateral margin of tergites edged with fuscous. Venter whitish, tinted and speckled with fuscous. Ovipositor ferruginous, dorsal valves long and slender, ventral valves a little wider, acutely pointed and scarcely one-half the length of the dorsal valves.

Holotype: ♀; Black Mountains, North Carolina. June, 1912. (Wm. Beutenmueller.)

For differentiation from allied forms, see under *P. calinota*.

Pachyrhina evasa spec. n. (Pl. IV, fig. 10.)

Yellow. Antennae entirely yellowish; occiput with shining triangular spot. Abdominal tergites margined posteriorly with yellowish-brown. Thorax similar to *P. montana*.

Female. Length, 18 mm.; wing, 13.5 mm.

Frontal prolongation brown anteriorly. Mouth parts and palpi yellow, last joint of the latter much longer than the three preceding joints. Antennae dark yellow, basal joint a shade paler, outer joints slightly infusate, verticels of pale yellow setae and distinctly shorter than in *P. montana*. Head otherwise as in the last named species.

Thorax pale yellow. Sides of pronotal scutum dark fuscous. Praescutal stripes ferruginous, the median stripe black in middle half, no pruinosity. Velvety black spot of lateral stripes large. Scutellum ferruginous, shining. Postnotum pale ocherous, subopaque, blackish posteriorly. Outer part of transverse suture and ante-alar part of pleura-dorsal suture, black. Pleura concolorous; intercoxal part of sternopleura and lower portion of mesopleura ocherous, a spot in the pleura-dorsal suture posteriorly and spot of mesosternum

brownish. Mesopleural suture in part, and posterior margin of metapleura tinted black. Halteres and legs as in *P. montana*. Wings with a yellowish tint, more marked in costal cell; cell Sc and margin of Cu and Cu² yellowish-brown; stigma dark brown, large; apex of wing infuscated, cord and veins M³ and Cu² margined with fuscous. Venation as in figure.

Abdomen light ocher-yellow; tergites two to six with ill-defined, pale brown, posterior triangle; posterior margin of tergites two to six ferruginous, of tergites seven to eight, blackish; a fuscous lateral stripe. Venter sordid yellowish. Ovipositor as in *P. montana*.

Holotype: ♀; Floodwood, Schoolcraft County, Michigan. July, 1915. (J. S. Royers.)

Easily distinguished from allied species by the sordid yellow antennae. Topotypic with *P. calinota*, it differs, aside from antennal characters, in the broadly triangular, shining occipital spot, the absence of the median black spot of the mesonotal scutum, very distinct in all my specimens of *P. calinota*, and the very different, abdominal markings.

Pachyrhina nexilis spec. n. (Pl. IV, fig. 11; pl. VII, fig. 29.)

Yellow. Antennal flagellum dark brown; vertex with three fuscous lines; occiput with broad, triangular, shining spot. Thoracic dorsum as in *P. evasa*. Wings hyaline; stigma dark brown. Median suture of ninth sternite of male with chitinized, pendulous process.

Male. Length, 12 mm.; wing, 11 mm.

Head. Proboscis very short, concolorous; frontal prolongation anteriorly and nasus, brown, the latter beset with black hairs. Mouth parts brown, palpi brownish-yellow, the last joint longer than the preceding joints. Antennae of moderate length, scapal joints orange-yellow, third joint yellowish-brown, paler at base, remaining flagellar joints dark brown, basal enlargement black, elongate and slightly emarginate beneath, last joint very slender, verticels sparsely setulose, pubescence very fine, white. Face and underside of head pale yellow; vertex and occiput orange-yellow, the former with three linear, fuscous spots, the latter with large, broadly-triangular, shining spot.

Thorax sulphur-yellow. Pronotal scutum tinted brownish on the sides. The median praescutal stripe dark brown, edged ferruginous, narrowed posteriorly, the lateral stripes ferruginous with median black line, the velvety black, anterior spot large; scutum with oblique, ferruginous stripe each side, the latter black anteriorly; transverse suture externally and its continuation to alar insertion, black. Scutellum dark yellow, infuscate in the middle. Postnotum sulphur-yellow on the sides, a broad median fuscous patch and ferruginous posterior declivity. Pleura concolorous, lower portion of sternopleura, lower part of mesopleura and metapleura anteriorly and posteriorly, ocherous. Halteres yellowish at base, infuscate toward the knob, the latter dark brown, white at the apex. Legs slender, coxae and basal portion of femora yellowish, the latter darker yellow towards the infuscated apex, tibiae

dark yellow, infusate apically, tarsi fuscous, metatarsi longer than the tibiae; pubescence very short, blackish. Wings hyaline, costal cells faintly yellow, stigma dark brown, basal section of R^4 and 5 , cross vein R-M and apex of wing, infusate. Costal veins and vein R and $M^{1,2}$ and 3 setulose. Venation as in figure.

Abdomen dark yellow, feebly shining, basal part whitish; a broad, not sharply defined dorsal stripe, more or less interrupted at the sutures, dark brown anteriorly, paler posteriorly; seventh and eighth segments almost entirely blackish; a pale fuscous, ill-defined, lateral stripe; eighth sternite slightly emarginate, fringed with long, yellow hairs. Hypopygium; ninth tergite dark ferruginous, wider than long, the lateral angles somewhat prominent, posterior border emarginate on the sides and in the middle, a median impressed line; rest of hypopygium ferruginous; outer appendages pale yellowish, very narrowly lanceolate, attenuated outwardly; inner appendages claw-like, curved upward; between these two appendages is a dark brown, acutely triangular process, pleural suture fine, straight, not curved upward in front; from the middle of the suture of the ninth sternite projects a pear-shaped strongly chitinated appendage, the narrowed end free, dark brown, projects downward.

Holotype: ♂; Clear Creek, Colorado. October 12, 1916. (E. J. Oslar.)

Paratypes: one male, topotypic, July 26, 1915; two males, Bear Creek, Morrison County, Colorado, August 23, 1916.

Quite distinct from the other species. For differentiation from allied species see under *P. calinota*. The three linear fuscous spots of the vertex distinguish this species from all others of this group. In two of the paratypes, the lateral thoracic stripes are entirely ferruginous.

***Pachyrhina festina* spec. n. (Pl. V, fig. 12.)**

Pale yellow. Flagellar joints unicolorous, basal joints yellow, outer joints yellowish-fuscous. Occiput shining. Wings with yellowish tint, stigma brown. Abdomen with lateral row of black strigae.

Male. Length, 12.5 mm.; wing, 12.5 mm.

Head pale yellow. Frontal prolongation lustrous, lightly touched with brown anteriorly, nasus beset with pale hairs; mouth parts fuscous; palpi yellowish-fuscous, the two outer joints paler, the last joint scarcely longer than the three preceding joints. Proboscis short, sides brown. Antennae of moderate length, very slender, scapal joints and basal joints of flagellum yellow, outer joints brownish-yellow, cylindrical, pubescence fine, dense, whitish, the hairs of the basal verticels as long or longer than the respective joints. Face and front opaque. Occiput shining, sordid yellowish, with a large, triangular spot which is a shade darker.

Thorax ivory yellow, shining. Pronotal scutum with pale brownish stripe each side of median line; scutellum brownish anteriorly. Lateral praescutal stripes chestnut brown, curved slightly outward, anteriorly; the median stripe reddish-brown, with paler median line, and narrowed posteriorly. Scutum concolorous, polished, each side with two large, coalescent, reddish-brown spots, the antero-exterior spot being the smaller. Scutellum and postnotum concolorous, the former slightly, the latter more markedly, infuscate along the middle. Legs slender, yellowish, pubescence very short, black, appressed, tibiae slightly infuscate at tip, outer joints of tarsi brownish; metatarsi longer than the tibiae. Wings hyaline with yellowish tint, costal cells pale yellow, stigma brown, costo-apical portion somewhat infuscate; veins C, Sc and Cu yellowish, others brown. Costal veins, vein R and veins $M^{1,2}$ and 3 , finely and sparsely setulose. Venation as in figure.

Abdomen sordid yellow, shining, with ill-defined, pale brown dorsal stripe, the apical half of the seventh and eighth tergite nearly entirely light brown; a lateral row of black strigae. Venter pale, eighth sternite with V-shaped incision, the margin of which is fringed with stiff, yellow hairs, longer and forming a pencil on the somewhat prominent, lateral angles of the incision. Hypopygium yellow; ninth tergite brown, moderately impressed anteriorly, a deep, rounded impression posteriorly and emarginate in the middle of the posterior border; each side of this emargination and from beneath the margin, projects a black, tooth-like process. Outer appendages lanceolate, attenuate outwardly and incurved towards each other.

Holotype: ♂; Plummer's Island, Maryland. July 28, 1912. (W. L. McAtee.)

Paratypes: one male, Hazleton, Pennsylvania, August 20, 1912, (W. G. Dietz) has the lateral abdominal strigae, much more marked; one male, Ridgeway, Ontario, Canada, August 15, 1910, (M. C. Van Duzee), has the antennal flagellum darker, the occipital triangle not apparent, the thoracic stripes ferruginous. A male specimen from Aweme, Manitoba, Canada, (E. Criddle), has the occiput less shining, the triangular spot distinct, but paler. Stigma a shade paler than in the holotype. It is larger—length, 16.5 mm.; wing, 15 mm.

In its shining occiput and unicolorous antennae flagellum, the present species closely approaches *P. sodalis* Loew, but is readily distinguished, by its very slender, pale yellowish-fuscon antennae, the flagellar joints of which are not emarginate beneath, the deeply incised eighth abdominal sternite and very deeply impressed ninth tergite.

***Pachyrhina temeraria* spec. n.**

Yellow. Sides of proboscis brown. Antennae entirely yellowish; occiput opaque with shining brown line. Wings with yellowish tint, costal cells yellowish, stigma brown. Abdomen with broad, dorsal stripe and lateral and ventral rows of black strigae.

Female. Length, 17.5 mm.; wing, 13 mm.

Head. Frontal prolongation shining, nasus beset with blackish hairs. Mouthparts and palpi brownish-yellow, basal joint of latter dark brown. Sides of proboscis brown. Face light yellow. Antennae yellowish, scapal joints shining and a shade paler, slender, pubescence fine, whitish, segments with basal verticels of dark setae. Vertex and occiput dark yellow, the latter with a narrow, brown, shining line.

Thorax ivory-yellow, shining; pronotal scutum ferruginous in middle. Praescutal stripes ferruginous, the middle stripe narrowed posteriorly, the lateral stripes not curved outwardly; scutum with curved ferruginous stripe each side. Scutellum and postnotum ferruginous, shining, the latter with large, ivory-yellow patch each side. Transverse suture externally and its continuation in the pleura-dorsal suture to and above the alar insertion, black. Pleura concolorous, shining. Halteres sordid yellow, club fuscous.

Legs yellowish, slender, pubescence coarse, black, femora slightly, tibiae markedly, infusate at the apex, outer tarsal joints infusate, metatarsi longer than the tibiae. Wings faintly grayish, with yellowish tint, especially marked along the veins, costal cells markedly tinted yellow; stigma brown; costo-apical portion somewhat infusate, a spot before and behind the stigma and fork of vein M whitish-hyaline. Rs oblique, short, curved near its base; cell M¹ sessile.

Abdomen yellow, base above, paler; a broad, pale brown, dorsal stripe extends from the posterior half of first tergite to end of the seventh; eighth segment entirely blackish, lateral margins of tergum and venter, with a row of black strigae. Ovipositor blackish at base, dorsal valves long and slender, obtusely pointed at the apex, ventral valves a little wider and scarcely more than one-half as long as the former.

Holotype: ♀; Floodwood, Schoolcraft County, Michigan. July 1915. (J. S. Rodgers.)

In its entirely pale yellowish antennae, this species is differentiated from all others. Its nearest ally is *P. perfida*, but the antennal flagellum of the latter is more yellowish-fuscous and lacks the occipital line; in coloration of wing, they resemble each other, but cell M¹ in *P. perfida* is long petioled. Aside from antennal characters, *P. temeraria* is distinguished from *P. ferruginea*, *interpunctata* and *occidentalis*, by the narrow, occipital line.

***Pachyrhina sodalis nictans* subsp. n.**

Differs from *P. sodalis* Loew as follows:

Head deep ferruginous; mouthparts and palpi dark yellow. Frontal prolongation and nasus shining, beset with long, black hairs. Antennae robust, scapal joints dark ferruginous, first flagellar joint yellowish-fuscous, remainder of flagellum dark brown; joints, except the outer ones, more deeply excised below. Face opaque, occiput with broad, shining triangle, projected anteriorly upon the vertex.

Thoracic dorsum dark, testaceous, almost pellucid, stripes indistinctly defined. Postnotum sordid yellow on the sides. Pleura sordid yellow, with moderate whitish sheen. Halteres yellowish-brown, club brown. Legs long, slender, yellowish; pubescence very short, blackish, tibiae slightly infusate at the apex, shorter than the metatarsi; outer tarsal joints infusate. Wings as in *sodalis*. Abdomen dark orange-yellow, an ill-defined, brownish dorsal stripe, eighth tergite darker, reddish-brown; a lateral row of black strigae and a ventral row of similar spots. Eighth sternite reddish-brown, not emarginate. Hypopygium ferruginous; ninth tergite reddish-brown, very short, deeply and narrowly emarginate in the middle; outer appendages dark yellow, not markedly attenuated towards the apex.

Length, 17 mm.; wing, 13.5 mm.

Holotype: ♂; Bear Creek, Colorado. June 29, 1914. (E. J. Oslar.)

The unique specimen in my possession is defective. In its unicolorous, blackish antennal flagellum and shining occiput it is closely allied to *P. sodalis* Loew, but its general dark ferruginous color, the stouter, more deeply excised flagellar segments and the highly polished thoracic dorsum, with its ill-defined stripes, give it a distinctive appearance. In its dark ferruginous appearance it resembles *P. cingulaia*; but is readily distinguished by its unicolorous flagellum, the wings without yellow tint and the abdominal tergites without latero-posterior black margins.

***Pachyrhina costumarginata* spec. n. (Pl. V, fig. 13.)**

Yellow. Occiput opaque with shining, triangular spot. Antennae, with the exception of the three basal joints, dark brown. Thoracic stripes shining, interspaces opaque. Wings slightly infusate, costal cells brown, stigma pale fuscous.

Male. Length, 9.5 mm.; wing, 8 mm.

Head deep yellow. Frontal prolongation with obscure, ferruginous, median stripe, nasus beset with black hairs, mouthparts and palpi dull yellow, first joint infusate at apex. Antennae of moderate thickness, pubescence dense, whitish; three basal joints yellow; joints four and five dark yellowish-brown, following joints dark brown, segments cylindroidal, basal enlargement marked with a whorl of few, rather short, black setae. Face pale yellow; frontal

tuberosity marked; a narrowly triangular, shining, occipital spot, scarcely darker than the surrounding color, an obscure dark line extends from the anterior end of the occipital spot to summit of the frontal tuberosity.

Thorax concolorous, dorsum, except the stripes, opaque, the latter highly polished, yellowish-red, the middle stripe narrowed posteriorly, narrowly margined ferruginous, a fuscous spot at the posterior end; lateral stripes rather wide, curved outward anteriorly, narrowly margined ferruginous on inner margin. Scutum with the exception of middle stripe shining, the latter with a fuscous spot at its base; a diffused yellowish-red stripe each side. Scutellum ferruginous, polished. Postnotum yellowish-red along the middle, shining, sides yellow, outer part of transverse suture and posterior end of pleuro-dorsal suture, black. Pleura light yellow, shining. Halteres sordid yellow, basal half of club brown, apical part yellowish-white. Legs slender, yellowish; femora and tibiae infuscate at the apex, the latter about as long as the metatarsi, tarsal joints fuscous; pubescence very short, sparse, blackish. Wings slightly fuscous, costal cells brown, stigma very pale fuscous; veins brown, vein C and Sc almost black. Cell M¹ sessile. Veins C, Sc, R and its branches and veins M^{1, 2 and 3} setulose. Venation as in figure.

Abdomen yellow, tergum with a pale fuscous spot each side of base, sternites two to five, each with a large, fuscous spot; eighth sternite rounded at the apex and fringed with long, yellow, silken hair. Hypopygium yellow; ninth tergite a little wider than long, longitudinally impressed in front, narrowly emarginate in the middle of the posterior margin, sides rounded; outer appendages paler, lanceolate.

Holotype: ♂; Bradentown, Florida. March. (M. C. Van Duzee.)

In its fuscous flagellum, shining occipital spot and the outer part of the transverse suture tinted black, this species is allied to *P. ferruginea*, *occidentalis* and *beutenmuelleri*, from all of which it differs in the brown costal cells of the wing. In the single specimen before me, vein R^{4 and 5} is peculiarly curved.

Pachyrhina beutenmuelleri spec. n. (Pl. V, fig. 14.)

Similar to *ferruginea* Fabricius. Flagellum unicolorous, blackish. A brown spot each side of vertex. Latero-posterior margins of abdominal segments black. The inner appendages of the hypopygium end in a style-like process.

Male. Length, 10.5 mm.; wing, 10.5 mm.

Head. Frontal prolongation shining, nasus long, beset with black hairs. Proboscis very short; mouthparts dark brown; basal joint of palpi dark yellow, brown at apex, following joints yellowish-fuscous. Face pale yellow. Antennae moderately long, the three basal joints reddish-yellow, the third joint infuscate apically, the rest of flagellum blackish, pubescence very fine, white; segments cylindroidal, enlarged at base with a whorl of but three or four black setae. Front and occiput opaque, orange-yellow, tuberosity promi-

ment, a dark brown spot each side of vertex, close to the orbit; a shining, ferruginous, elongate-triangular occipital spot, prolonged as a fine, brown line to summit of tuberosity.

Thorax yellow. Pronotal scutum brown on the sides. Praescutal stripes highly polished, ferruginous, the middle stripe narrowed posteriorly, the lateral stripes slightly curved outward anteriorly. Scutum with lateral, curved, ferruginous stripes, an elongate, brown spot on the anterior end of the median space. Scutellum ferruginous, shining. Postnotum ferruginous along middle portion and posterior declivity, yellow on the sides. Outer portion of transverse suture and a triangular spot before the alar insertion, blackish. Pleura concolorous, lower part of mesopleura, posterior margin of metapleura and a few irregular, smaller spots, ferruginous; a conspicuous, elongate, opaque spot in the pleuro-dorsal membrane immediately behind the middle, a less conspicuous, brown spot below it. Halteres pale fuscous, club dark brown, apical edge paler. Legs slender, sordid yellow, pubescence blackish, tibiae blackish at the apex, about as long as the metatarsi, outer tarsal joints fuscous. Wings nearly hyaline with a grayish tint, surface sparsely pilose, veins C, Sc, R and all veins beyond the cord, with the exception of those limiting cell 1st M², rather closely setulose; costal cells concolorous, stigma pale brown; cell M¹ sessile. Venation as in figure.

Abdomen orange-yellow, shining, darker posteriorly, segments on the sides and posteriorly, bordered with black; the eighth sternite narrowly but deeply emarginate. Hypopygium ferruginous-brown; ninth tergite with deep, V-shaped emargination; outer appendages pale yellow, broadly lanceolate, obtusely pointed; the inner appendages end in a style-like process, directed dorsad.

Holotype: ♂; Black Mountains, North Carolina.

Paratype: ♂; topotypic. September 4, 1911. (Wm. Beutenmueller.)

Might readily be taken for *P. ferruginea*, but the fuscous spots on vertex, the abdominal segments bordered with black on the sides and posteriorly and the formation of the inner appendages, easily distinguish it from the last named species. In general appearance, *P. beutenmuelleri* resembles *cingulata*, but this species has the flagellar segments bicolored, the costal cells yellow-tinted, besides other differences. Dedicated to Mr. Wm. Beutenmueller.

Pachyrhina cingulata spec. n. (Pl. V, fig. 17; Pl. VII, fig. 30.)

Antennae of male long, flagellar joints bicolored, fuscous at base. Thoracic dorsum highly polished, testaceous, stripes ill-defined. Lateral margin of abdominal tergum, and segments posteriorly, bordered black.

Male. Length, 13 mm.; wing, 11 mm.

Head dark ferruginous. Mouthparts and palpi dark brown, terminal joint of the latter a trifle longer than the three preceding joints combined. Frontal prolongation polished, beset with blackish hairs, more dense upon the nasus.

Face and front opaque, the latter with a darker median spot. Antennae elongate, joints one to four dark yellow, following joints dark yellow, fuscous at base, flagellar joints two to six or seven, deeply emarginate beneath, outer joints nearly cylindroidal; pubescence fine, dense; the basal setae confined almost entirely to the dorsal side. Occiput shining, acutely produced anteriorly. A large black spot each side of base of neck.

Thorax. Pronotal scutum and scutellum dark ochereous, opaque. Dorsum highly polished, testaceous; praescutal stripes ill-defined, those of the scutum distinct, consisting each of a large, dark ferruginous, antero-exterior spot and a somewhat paler, postero-interior stripe. Scutellum and postnotum yellowish. Pleura yellowish, shining, with some scattered, ochereous spots and patches. Halteres yellowish-brown, paler at base, club fuscous at the apex. Legs dull yellow, very slender, densely beset with rather coarse, short hair, the three outer tarsal joints fuscous, metatarsi much longer than the tibiae. Wings strongly tinted yellow, costal cells and margin of vein Cu and Cu¹ more markedly yellow, stigma pale brown; costo-apical region somewhat infuscated; veins C, Sc, and R and its branches, shortly and rather closely setulose; veins M^{1, 2 and 3} more sparsely setulose, and setulae rather long and fine. Venation as in figure.

Abdomen testaceous, lustrous; first tergite with black median stripe, a more or less interrupted lateral stripe and posterior margin of segments black, paler and interrupted on some segments. Venter with a row of black spots. Eighth sternite with rounded emargination, the latter fringed with yellow hair. Ninth tergite light brown, rounded latero-posteriorly with a large, deep, semi-circular impression anteriorly, giving the appearance as though the tergite consisted of two incurved processes, leaving a narrow space between the latter, apically. Outer appendages of hypopygium brownish, basal half lanceolate, apical half very slender, curved ventrad, the inner (?) appendages consist of a pair of blackish, strongly chitinized processes, projecting posteriorly, turned up angularly at the end and ending in an acute spine; an acutely, triangular tooth externally and a spine within near the base; ninth sternite brown, long, with wide median fissure containing a pale yellowish body, pleural suture faint, slightly curved but not curved dorsad anteriorly.

Female. Length, 16 mm.; wing, 13 mm.

Very similar to the male. Antennae relatively short, joints one to five or six fairly stout, following joints very slender, verticils complete. Stripes of mesonotal scutum less distinct. The lateral stripe of the abdomen and the posterior margin of the segments, completely and conspicuously banded with black; the first tergite without median stripe, posterior segments more extensively black. Ovipositor dark ferruginous, dorsal valves long and slender, slightly curved downward at the apex; ventral valves slender, three-fourths the length of the upper valves, pointed.

Holotype: ♂; Hazleton, Pennsylvania. July 11, 1913. (W. G. Dietz.)

Allotype: ♀; topotypic. August 18, 1915.

Paratypes: nine females, topotypic, June, July, August.

A very distinct species. Closely allied to *P. xanthostigma*, with which it agrees in the antennal structure, the shining occiput and coloration of wings, and from which it is readily distinguished in its dark testaceous or ferruginous color, the abdominal segments conspicuously—especially in the female—banded with black and the very differently constructed hypopygium.

All the specimens were taken in a rather circumscribed marshy locality, where rarely more than one or two specimens were taken in a season.

Pachyrhina obliterata spec. n. (Pl. V, fig. 15; pl. VII, fig. 31.)

Yellow. Flagellar joints of antennae bicolorous, blackish at base. Occiput shining. Thoracic stripes ferruginous, the transverse suture black externally. Abdomen with dorsal stripe and lateral rows of spots, dark fuscous.

Male. Length, 14 mm.; wing, 12.5 mm.

Head concolorous. Proboscis very short, sides fuscous; frontal prolongation with two ferruginous lines, beset with dark hairs, more dense on the nasus. Mouthparts brown. Palpi yellowish-brown, the last joint shorter than the three preceding joints. Face pale yellow and like the front, opaque. Antennae of moderate length and thickness, the three basal joints dark yellow, the following joints dusky yellow and, with the exception of the apical joints, distinctly emarginate beneath, above the basal enlargement, the latter blackish, hairs of the verticel blackish and rather long; pubescence fine, whitish. Occiput shining, extending triangularly upon the vertex.

Thorax shining, sulphur yellow. Pronotal scutum and scutellum tinted with fuscous, the former with a pale line each side. Dorsal stripes ferruginous, the middle stripe narrowed posteriorly, lateral stripes curved outward anteriorly; the interspaces between the middle and lateral stripes, margined black on their anterior margins. Scutum with a broad stripe each side, which leaves but a narrow margin of the ground color externally and a nearly parallel, median stripe. Scutellum and broad median stripe of postnotum ferruginous. Transverse suture heavily black in middle section, less so on its exterior ends, again very conspicuously so in the pleuro-dorsal suture before the alar insertion. Pleura concolorous, sternopleura inferiorly, and a few small, inconspicuous spots, ocherous. Halteres dark yellow, club brown, apex paler. Legs slender, dark yellowish covered with a dense, grayish pubescence, femora and tibiae lightly infusate towards the apex, outer joints of tarsi fuscous, metatarsi longer than the tibiae. Wings with a grayish tint, dispersedly pubescent; costal veins, vein R and the veins beyond the cord with the exception of those limiting cell 1st M^2 setulose; costal cells and margin of vein Cu, pale yellow; stigma yellowish with a fuscous tint, apical part lightly infusate.

Abdomen yellow with light fuscous touch, a dark brown dorsal stripe, paler posteriorly and more or less interrupted, extends from the base to the sixth tergite, the seventh tergite apically and the eighth nearly entirely, blackish; a lateral row of large, elongate black spots, alternating with fine black strigae;

sternites one to four, with an ill-defined, fuscous spot, eighth sternite feebly emarginate. Hypopygium yellowish-ferruginous, the ninth tergite short, rounded on the sides, deeply impressed and emarginate in the middle posteriorly, outer appendages lanceolate, directed dorsad, inner appendages, strongly chitinized, curved upward and fringed with yellowish hairs.

Female. Length, 17 mm.; wing, 15.5 mm.

Very similar to the male. Antennae shorter. The anterior margin of the interspaces between the middle and the lateral thoracic stripes, is pale brown; the black coloration of the transverse suture much less in evidence; scutellum and postnotum pale yellow. Metatarsi much longer than the tibiae. Abdominal markings less defined, the ninth tergite, except apically, blackish. Ovipositor ferruginous—valves broken.

Holotype: ♂; Wyalusing, Bradford County, Pennsylvania. August 3, 1916. (W. G. Dietz.)

Allotype: ♀; topotypic.

Paratypes: two males, topotypic, one male, Floodwood, Schoolcraft County, Michigan, July, 1915, (J. S. Rogers); one female, Ottawa, Canada, July 26, 1912, (Germain Beaulieu).

A rather isolated form. Its nearest ally is *P. xanthostigma* Loew, from which it is readily differentiated, by its shorter and more dusky antennae. The wings are hyaline and pubescent with a grayish tint, while the abdomen is dusky yellow with a distinct dorsal stripe. The allotype, has cell M¹ sessile in one wing, short-stemmed in the other. The paratype from Michigan, has this cell long-stemmed in both wings. The paratype from Canada, has a reddish-brown occipital line.

Pachyrhina wyalusingensis spec. n. (Pl. V, fig. 16; pl. VII, fig. 32.)

Similar to *P. obliterata*. Head dark testaceous. Flagellar joints bicolored, blackish at base. Occiput shining. Thoracic stripes dark ferruginous. Abdomen dark testaceous, lateral margins of tergum and posterior margins of segments, bordered black.

Male. Length, 14 mm.; wing, 12.5 mm.

Head. Mouthparts fuscous. Palpi dark ferruginous. Frontal prolongation with two dark lines. Three basal joints of antennae reddish-yellow, following joints yellowish-fuscous, basal enlargement blackish; pubescence dense, whitish; segments emarginate beneath. Front opaque with a fuscous dot close to the orbital margin. Occiput shining, with a small fuscous spot at its base.

Thorax shining, yellow. Pronotal scutum and scutellum tinged with fuscous. Praescutal stripes as in *obliterata*, the lateral stripes not curved outwardly, scutum, scutellum, postnotum and pleura as in *obliterata*, the transverse suture less markedly black in middle portion. Halteres yellowish-fuscous, club dark fuscous. Legs long and slender, dusky yellowish, femora and

tibiae infusate at the apex, outer tarsal joints dark brown. Wings with a pale fuscous tinge, costal cells yellowish, stigma yellowish with scarcely perceptible fuscous tinge, surface finely and very sparsely pilose, veins C, Sc, R and its branches and veins M^1 , ^{2} and ^{3} setulose. Venation as in figure.

Abdomen testaceous, shining. A black, conspicuous, lateral stripe and segments banded with fuscous on the posterior margin, less marked on the posterior segments. Eighth segment brown. Venter paler with some ill-defined, brownish spots, eighth sternite scarcely emarginate. Hypopygium dark ferruginous; the ninth tergite slightly impressed anteriorly, more broadly and deeply posteriorly, with a narrow and deep incision in the posterior margin, outer appendages narrow, incurved; inner appendages relatively short, stout, somewhat compressed, directed dorsad; ninth sternite deeply incised, the incision fringed with golden-yellow hair.

Female. Length, 18 mm.; wing, 14 mm.

Similar to male. Antennae shorter and more slender. The fuscous spot at base of occiput faintly indicated. Thoracic dorsum almost pellucid, the middle stripe wider anteriorly. Intercostal portion of sternopleura and greater part of mesopleura ochreous. Lateral margin of abdominal tergum and posterior margin of all the segments, conspicuously bordered black; eighth segment brown. Ovipositor brown, dorsal valves moderately long, ferruginous towards the tip, ventral valves extend a little beyond the middle of the upper valves, pale, acute.

Holotype: ♂; Wyalusing, Bradford County, Pennsylvania. August 3, 1916. (W. G. Dietz.)

Allotype: ♀; topotypic.

Pachyrhina latevittata spec. n. (Pl. V, fig. 18.)

Pale yellow; head ferruginous. Flagellar joints of antennae bicolored, dark fuscous at base. Occiput with shining spot. Thoracic stripes pale tan color, broad. Wings hyaline, stigma almost so. Abdominal tergites two to five with two, pale brown, dorsal lines.

Female. Length, 16 mm.; wing, 15 mm.

Frontal prolongation dark yellowish, shining, subcarinate with median dark line, hairy vestiture black, dense on nasus. Mouthparts large, and like the palpi, sordid yellow. Proboscis very short. Face and occiput opaque, the latter with a broadly subtriangular, shining spot, frontal tuberosity strongly marked. Antennae short, scapal joints ferruginous, flagellar joints dark, sordid yellow, fuscous at base, with verticels of rather short, black setae.

Thorax concolorous with feeble luster. Pronotal scutum brown on the sides. Praescutal and scutal stripes a pale tan, the former finely and interruptedly margined with brown, the middle stripe very little narrowed posteriorly. Scutellum and postnotum with a little more luster, the former light ferruginous, the latter yellowish on the sides, ferruginous along the middle. Transverse suture, except its middle third, and its continuation before the alar insertion, black. Pleura concolorous, with a white sheen, a broad, irregu-

lar whitish stripe extends from the upper part of the sternopleura to the metapleura and margin of the postnotum. Halteres dark yellowish at base, brownish towards and including the club. Legs very slender, pale yellowish, metatarsi pale fuscous, rest of tarsi darker; pubescence very short, black; tibiae a little longer than the metatarsi. Wings entirely hyaline, stigma with faint tinge of brownish. Cell M^1 rather broadly sessile. Veins C, Sc and R, $M^{1, 2}$ and 3 very finely setulose. Pl. V, fig. 18.

Abdomen yellow. Tergite two with a brown spot anteriorly, posteriorly similar to tergites three and four with two, brownish, dorsal lines, tergites five to eight, tinged with pale brown; venter a shade paler. Ovipositor yellow, dorsal valves, long and narrow, ventral valves rather short, lanceolate, pointed.

Holotype: ♀; South Park, Colorado. June 17, 1916. (E. J. Oslar.)

An isolated form. The dark ferruginous head is in strange contrast to the general yellow color. From its nearest allies, *P. suturalis* Loew and *abbreviata* Loew, it is distinguished by the entirely hyaline wings and almost colorless stigma.

Pachyrhina approximata spec. n. (Pl. V, fig. 19; pl. VII, fig. 33.)

Antennae of male long, flagellar joints fuscous, ferruginous at base—except outer joints. Occiput shining with brown stripe. Thoracic stripes ferruginous-brown. Abdomen with black lateral stripes, segments margined with fuscous posteriorly.

Male. Length, 12 mm.; wing, 12 mm.

Frontal prolongation dark yellow, shining, with two, brown, dorsal lines and beset with black hairs; sides of proboscis brown at base; mouthparts and palpi yellowish-brown, first palpal joint yellow at base. Face yellow with a brown, triangular spot. Antennae slender, extended back they reach beyond the base of the abdomen; scapal joints light ferruginous, flagellar joints brown, joints two to seven ferruginous at base, emarginate beneath, verticels incomplete, setae shorter than the respective joints; pubescence dense, whitish. Occiput ferruginous, shining with dark brown, median stripe. Neck brown.

Thorax shining above, yellow. Pronotal scutum and scutellum opaque, the former brownish in the middle and a spot on the sides. Praescutal stripes dark brown anteriorly, ferruginous posteriorly, the middle stripe strongly narrowed posteriorly. Scutum sulphur yellow with a ferruginous stripe each side and a similar spot within the alar insertion. Scutellum ferruginous. Postnotum sulphur yellow, with median line and posterior declivity light ferruginous. Pleura sulphur yellow; intercoxal part of sternopleura, lower half of mesopleura, and metapleura posteriorly, ocherous-ferruginous. Middle portion of transverse suture tinted blackish. Legs long and slender, yellowish-brown, femora and tibiae infusate apically, tarsi fuscous, metatarsi markedly longer than the tibiae, pubescence dense, coarse, blackish. Halteres brownish-yellow, apical half of club dark brown. Wings grayish, costal cells and margin of vein Cu and Cu^1 tinted yellow, stigma yellowish with faint brownish tint; cell M^1 sessile. Costal veins, vein R and veins $M^{1, 2}$ and 3 setulose. Venation as in figure.

Abdomen testaceous, an obscure, interrupted dorsal line, broad and conspicuous black lateral stripe and posterior margin of segments, dark brown; eighth segment entirely blackish-brown, sternite with deep V-shaped incision enclosing a paler, median appendage. Hypopygium, except the ninth tergite, yellowish; the latter brown, rounded latero-posteriorly, lightly impressed in front and behind and slightly emarginate in the middle, outer appendages elongate—lanceolate, anticlinal; ninth sternite deeply emarginate, each side anteriorly with a strongly curved, claw-like process, directed dorsad. Pl. VII, fig. 33. Pleural suture straight, abbreviated.

Female. Length, 19 mm.; wing, 13.5 mm.

Similar to the male. Head orange-yellow. Antennae short, flagellar segments slightly emarginate beneath, setae of verticels shorter than the respective joints. The thoracic stripes are less infuscated anteriorly and the pleural markings paler; the dark spot on the metapleura is absent. Dorsal stripe of abdomen, blackish and uninterrupted; the lateral stripes and the black margins of the segments, here and there interrupted. Ovipositor ferruginous; dorsal valves very narrow, not very long; the ventral valves broader and nearly the length of the upper valves.

Holotype: ♂; Wyalusing, Bradford County, Pennsylvania. August 2, 1916. (W. G. Dietz.)

Allotype: ♀; topotypic.

Paratypes: four females, topotypic.

Closely resembles *P. cingulata*, but differs in the flagellar joints being dark brown at base. Thoracic stripes distinct and the wings more grayish. From *P. brevicornis* Loew, it differs in the abdominal markings.

***Pachyrhina stigmaticea* spec. n.** (Pl. V, fig. 20; pl. VII, fig. 34.)

Honey-yellow. Antennae—male—short, flagellar joints, except the first, bicolored, yellow at base. Thoracic stripes dark-ferruginous. Stigma dark brown. Abdomen with dorsal stripe and lateral and ventral rows, of black spots; eighth sternite produced, not emarginate.

Male. Length, 14 mm.; wing, 12.5 mm.

Head concolorous; frontal prolongation shining, darker anteriorly, the hairy vestiture rather long, dark, nasus long, infusate. Mouthparts and basal joint of palpi brown, remaining palpal joints brownish-yellow, the last joint a little longer than the others combined. Sides of proboscis brownish. Face and scapal joints of antennae pale yellow, flagellar joints slender, cylindrical, brown, yellow at base; verticels complete, setae long; pubescence whitish. Occiput shining, somewhat tinged with fuscous on the sides and an ill-defined brownish spot each side near the orbital margin.

Thorax concolorous, shining. Pronotal scutum broadly brownish in middle portion, which is continued as a stripe upon the neck to base of occiput. The middle thoracic stripe narrowed posteriorly and divided by a pale line, lateral

stripes rather narrow and short, straight. Scutum with a subangulate stripe each side, leaving a pale, parallel median space; extreme outer end of transverse suture and spot before alar insertion, black. Scutellum and postnotum concolorous. Pleura with a few indistinct, darker spots and a whitish sheen. Halteres sordid yellowish, club pale fuscous, apex dark brown. Legs long, slender, yellowish, pubescence coarse, black; femora and tibiae lightly infusate at the apex, outer tarsal joints fuscous, the metatarsi a little longer than the tibiae. Wings hyaline with yellowish tint, costal cells and border of vein Cu and Cu¹ yellowish. Stigma pale brown, costal region beyond the stigma, lightly infusate. Veins M^{1,2} and ³ and Cu¹ distinctly setulose. Venation as in figure.

Abdomen concolorous. A brown dorsal stripe extends from base to seventh tergite, less defined and paler posteriorly; lateral margin of tergum with a row of black spots, large and semi-ovoidal on tergites two to five; venter pale yellowish, each sternite with a small, elongate, black dot; eighth segment, with the exception of apical half of sternite, dark brown, the sternite produced, scarcely emarginate, fringed with long hairs, which form a sort of curved pencil at each apical angle. Hypopygium, except the ninth tergite, yellowish, the latter dark brown, somewhat swollen, rounded latero-posteriorly, deeply impressed in front and behind, emarginate in the middle; from below the margin project two very slender processes; outer appendages lanceolate, attenuated and curved downward; the inner appendages claw-like, curved down and inward; ninth sternite deeply emarginate; from the anterior part projects an upcurved, claw-like process.

Holotype: ♂; Wyalusing, Bradford County, Pennsylvania. August 4, 1916. (W. G. Dietz.)

Paratype: ♂; topotypic.

Closely allied to and easily confounded with *P. brevicornis* Doane, from which it differs in the protuberant and scarcely emarginate eighth sternite of the male, and different construction of the hypopygium. The paratypic specimen, has the lateral row of abdominal spots coalescent, thus forming an uninterrupted lateral stripe.

EXPLANATION OF PLATES

Plate IV

- Fig. 1.—Wing of *P. oslari*.
Fig. 2.—Wing of *P. macrophallus*.
Fig. 3.—Wing of *P. puncticollis*.
Fig. 4.—Wing of *P. hirsutula*.
Fig. 5.—Wing of *P. urocera*.
Fig. 6.—Wing of *P. cornifera*.
Fig. 7.—Wing of *P. calinota*.
Fig. 8.—Wing of *P. montana*.
Fig. 9.—Wing of *P. opacivittata*.
Fig. 10.—Wing of *P. evasa*.
Fig. 11.—Wing of *P. nexilis*.

Plate V

- Fig. 12.—Wing of *P. festina*.
Fig. 13.—Wing of *P. costomarginata*.
Fig. 14.—Wing of *P. beutenmuelleri*.
Fig. 15.—Wing of *P. oblitterata*.
Fig. 16.—Wing of *P. wyalusingsensis*.
Fig. 17.—Wing of *P. cingulata*.
Fig. 18.—Wing of *P. latevittata*.
Fig. 19.—Wing of *P. approximata*.
Fig. 20.—Wing of *P. stigmatica*.
Fig. 21.—Hypopygium of *P. oslari*; lateral aspect.
Fig. 22.—Hypopygium of *P. hybrida*; lateral aspect.
Fig. 23.—Hypopygium of *P. okefenoke*; dorsal aspect (from a paratype kindly given me by Mr. C. P. Alexander).

Plate VI

- Fig. 24.—Hypopygium of *P. macrophallus*; lateral aspect.
Fig. 25.—Hypopygium of *P. urocera*; lateral aspect.
Fig. 26.—Hypopygium of *P. cornifera*; dorsal aspect.
Fig. 27.—Hypopygium of *P. tenuis*; ventral aspect; 27 A, outer and inner appendages, seen from within; 27 B, anterior end of penis-guard with its geniculate, rod-like processes (Snodgrass).

Plate VII

Fig. 28.—Hypopygium of *P. tenuis hamata*; lateral aspect, showing the protuberant and strongly geniculate rod-like processes.

Fig. 29.—Hypopygium of *P. nexilis*; lateral aspect.

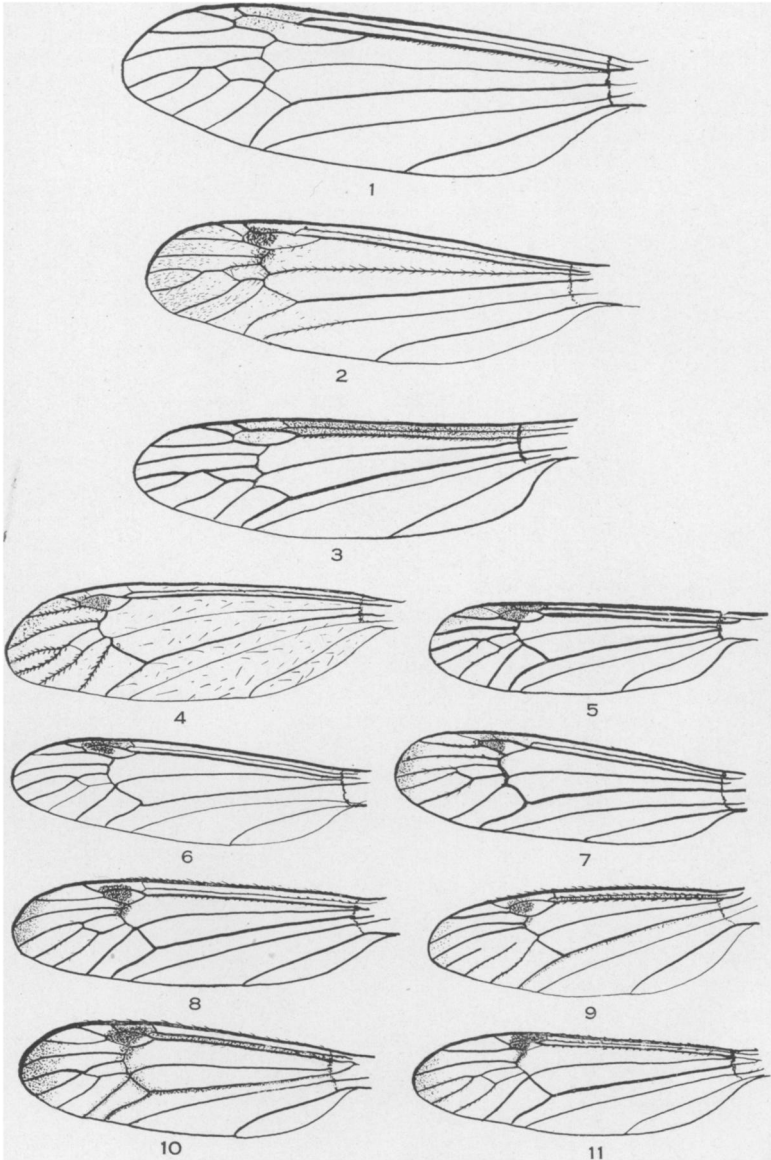
Fig. 30.—Hypopygium of *P. cingulata*; dorsal aspect.

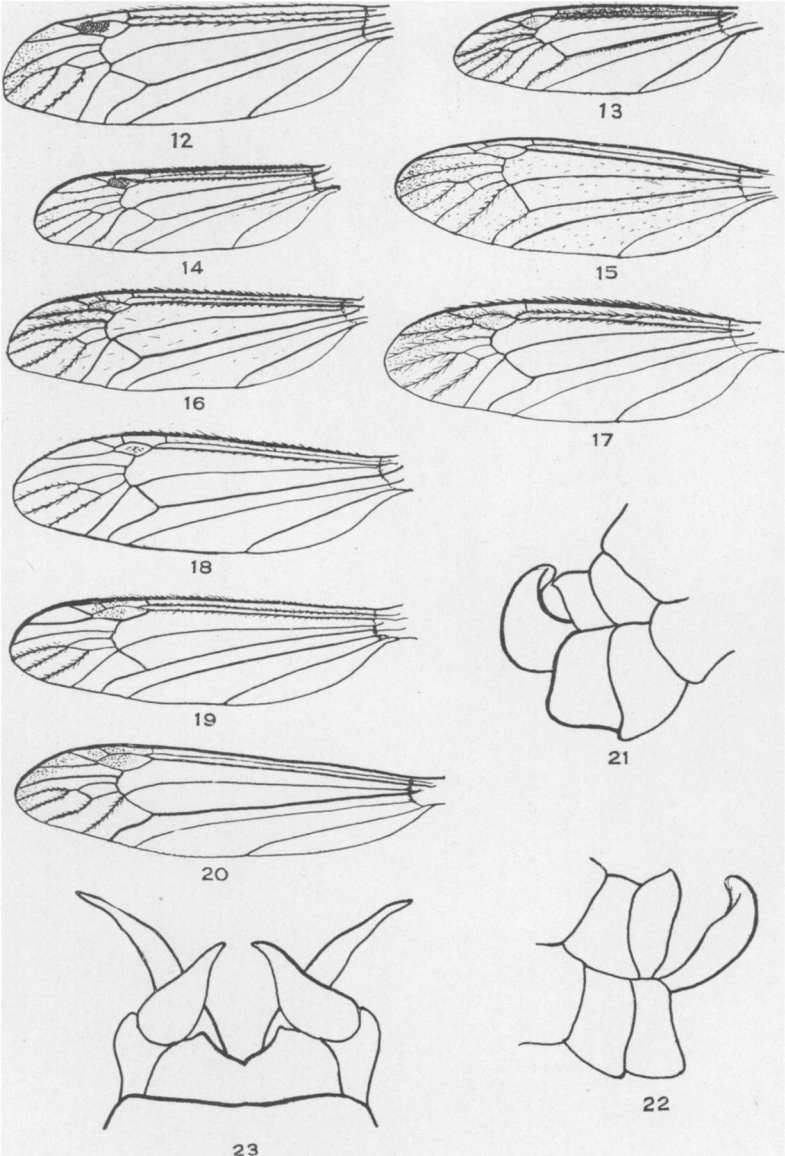
Fig. 31.—Hypopygium of *P. obliterated*; ventral aspect.

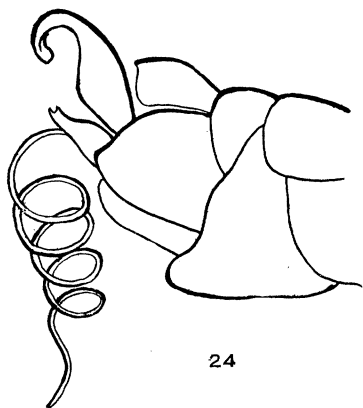
Fig. 32.—Hypopygium of *P. wyalusingensis*; ventral aspect.

Fig. 33.—Hypopygium of *P. approximata*, lateral aspect.

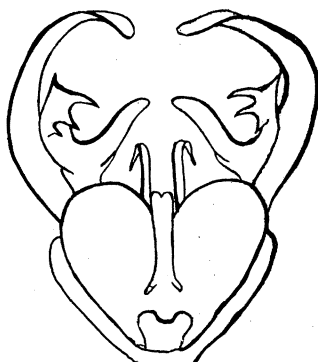
Fig. 34.—Hypopygium of *P. stigmatica*; lateral aspect.



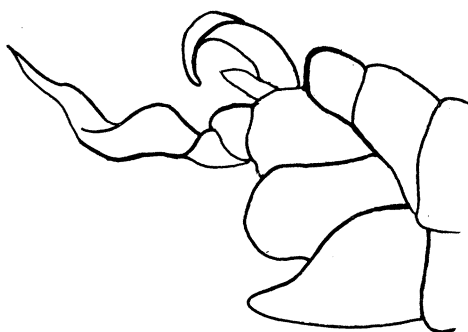




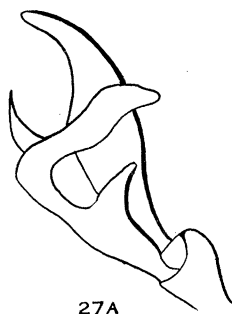
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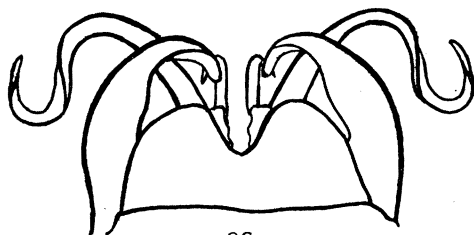
27



25



27A



26



27B

